What is SARE?

Since 1988, the Sustainable Agriculture Research & Education (SARE) program has been the go-to USDA grants and outreach program for farmers, ranchers, researchers and educators who want to develop innovations that improve farm profitability, protect water and land, and revitalize communities. To date, SARE has awarded over $389 million to more than 8,519 initiatives.

SARE is grassroots with far-reaching impact

Four regional councils of expert practitioners set priorities and make grants in every state and island protectorate.

SARE communicates results

SARE shares project results by requiring grantees to conduct outreach and grower engagement; and by maintaining an online library of practical publications, grantee-produced information products and other educational materials.

SARE: Advancing the Frontier of Sustainable Agriculture in...

South Carolina

Project Highlight: Fruit Bagging Reduce Reliances on Pesticides

When Clemson University fruit specialist Juan Carlos Melgar suggested putting a paper bag over a peach to detract insects and diseases during production, farmers laughed. But when his SARE-funded trials showed that the technique protects the fruit from devastating brown rot, marauding insects like plum curculio and even hungry birds, producers and backyard growers started paying attention.

Researchers found that bagging peaches between petal fall and harvest reduces pesticide use while increasing yields and maintaining flavor. Even though it involves more labor, Melgar estimated that bagging can increase revenue by $95 per tree in an organic system when the fruit is sold directly to consumers. “We’ve gotten a lot of positive responses from farmers all over the country as a result of the research study,” said Melgar.

Fruit bagging for protection is a common strategy in Asia. With South Carolina ranked second in the nation behind California in peach production at 77,000 tons, researchers at Clemson felt that applying the technique to orchards was a worthwhile endeavor because peach growers in the southeastern U.S. face very high pest and disease pressures. Melgar is taking this research to a regional level with a newly acquired $1 million USDA-NIFA grant, applying the technique to more orchards in South Carolina, Georgia and Florida.

For more information on this project, see sare.org/projects, and search for project number OS16-094.

SARE in South Carolina

southern.sare.org/sare-in-your-state/south-carolina

$5,096,043 in total funding

80 grant projects

(since 1988)

For a complete list of grant projects state by state, go to www.sare.org/state-summaries
SARE Grants in South Carolina

Total awards: 80 grants
- 19 Research and Education
- 6 Sustainable Community Innovation
- 13 Professional Development Program
- 21 Farmer/Rancher
- 8 Graduate Student
- 10 On Farm Research/Partnership
- 3 Education Only

Total funding: $5,096,043
- $3,670,122 Research and Education
- $43,620 Sustainable Community Innovation
- $799,675 Professional Development Program
- $197,885 Farmer/Rancher
- $106,864 Graduate Student
- $142,377 On Farm Research/Partnership
- $135,500 Education Only

Find a complete list of projects on page 3.

SARE's Impact

53 percent of producers report using a new production technique after reading a SARE publication.

79 percent of producers said they improved soil quality through their SARE project.

64 percent of producers said their SARE project helped them achieve higher sales.

Learn about local impacts at: southern.sare.org/sare-in-your-state/south-carolina

Contact Your SARE State Coordinator

SARE sustainable ag coordinators run state-level educational programs for Extension and other ag professionals, and many help grant applicants and recipients with planning and outreach. Visit southern.sare.org/state-pages/south-carolina to learn more.

John Andrae
Clemson University
(864) 656-4080
jandrae@clemson.edu

Joshua Idassi
South Carolina State University
(803) 878-9038
jidassi@scsu.edu

For detailed information on SARE projects, go to www.SARE.org

SARE is funded by the USDA’s National Institute of Food and Agriculture (NIFA).

This report includes summaries of competitive grant programs only. Some competitive grant programs that are no longer offered may be included or excluded from the totals in this report depending on the grant program and SARE region.
South Carolina has been awarded $5,096,043 grants to support 76 projects, including but not limited to, 15 research and/or education projects, 13 professional development projects and 21 producer-led projects. South Carolina has also received additional SARE support through multi-state projects.

## RESEARCH AND EDUCATION GRANTS

<table>
<thead>
<tr>
<th>Project #</th>
<th>Project Title</th>
<th>SARE Support</th>
<th>Project Leaders</th>
</tr>
</thead>
</table>
| LS23-379  | Flipping the cages on sustainable aquaculture: a study on oyster aquaculture technique and policy to reduce pathogens | $358,557 | Sarah Pedigo  
South Carolina Sea Grant Consortium  
Matthew Gorstein  
South Carolina Sea Grant Consortium  
Dr. Peter Kingsley-Smith  
South Carolina Department of Natural Resources Marine Resources  
Mike Marshall  
South Carolina Department of Health and Environmental Control  
Dr. Matthew Nowlin  
College of Charleston |
| LS22-374  | Cover crop inter-seeding in organic corn production to reduce resource inputs and soil disturbance and enhance pest control and farm profitability | $371,000 | Dr. Sruthi Narayanan  
Clemson University  
Dr. Carmen Blubaugh  
University of Georgia  
Dr. Joshua Idassi  
South Carolina State University  
Dr. Dave Lamie  
Clemson University  
Dr. Meghnaa Tallapragada  
Temple University  
Dr. Rongzhong Ye  
Clemson University |
| LS22-369  | Establishing an Organic Watermelon Industry in South Carolina | $369,999 | Matthew Cutulle  
Clemson University, CREC  
Dr. Bhupinder Farmaha  
Clemson University  
Dr. Shaker Kousik  
USDA-ARS - United States Vegetable Lab  
Dr. Amnon Levi  
USDA-ARS-United States Vegetable Lab  
Brian Ward |
| LS22-366  | Development of Sustainable Strategies for Managing Bacterial Diseases and Improving Tree Health in the Peach Production System | $371,000 | Hehe Wang  
Clemson University  
Juan Carlos Melgar  
Clemson University  
Guido Schnabel  
Clemson University  
Dr. Michael Vassalos  
Clemson University  
Dr. Rongzhong Ye  
Clemson University |
| LS21-355  | Gullah/Geechee Agro-Culture: Sustaining Culture to Sustain Agriculture in the Lowcountry | $341,346 | Dr. Najmah Thomas  
University of South Carolina Beaufort |
### Strengthening Farmer-consumer Connections for Sustainable Agricultural Systems  
- **LS21-359**  
- **Support:** $213,954  
- **Project Leaders:**  
  - Courtney Quinn  
  - Furman University  
  - Dr. Karen Allen  
  - Furman University  
  - Dr. John Quinn  
  - Furman University

### Utility of Anaerobic Soil Disinfestation and Organic Herbicides for Weed and Disease Management in Organic Solanaceous Vegetable Systems  
- **LS19-306**  
- **Support:** $293,470  
- **Project Leaders:**  
  - Matthew Cutulle  
  - Clemson University, CREC

### Incorporating Natural, Non-toxic Arthropod Resistant Tomato Varieties into Southern Production Systems  
- **LS19-305**  
- **Support:** $299,963  
- **Project Leaders:**  
  - Juang-Horng Chong  
  - Clemson University

### Improving Silvopasture Systems in the South: Identification of Suitable Forage Crops and Enhancement of Environmental Quality in Upland Forests  
- **LS16-273**  
- **Support:** $135,487  
- **Project Leaders:**  
  - Dr. John Quinn  
  - Furman University

### Improvement of the safety of food handling practices on small farms  
- **LS09-217**  
- **Support:** $200,000  
- **Project Leaders:**  
  - Dr. Paul Dawson  
  - Clemson University

### Expanding the grazing season for sustainable year-round forage-finished beef production  
- **LS06-188**  
- **Support:** $163,000  
- **Project Leaders:**  
  - Susan Duckett  
  - Clemson University

### Development and Integration of Sustainable Agriculture Core Curriculum Training into the Southern Region Extension Education System  
- **LS04-213**  
- **Support:** $241,000  
- **Project Leaders:**  
  - Dr. Geoff Zehnder  
  - Clemson University

### Suppression of weeds and other pests in fresh market vegetables using wild radish cover crop  
- **LS03-157**  
- **Support:** $173,125  
- **Project Leaders:**  
  - Jason Norsworthy  
  - Clemson University

### Creating a value chain system for local and regional farm products  
- **LS03-155**  
- **Support:** $19,310  
- **Project Leaders:**  
  - Dr. Geoff Zehnder  
  - Clemson University

### Evaluation of Low-Input, No-Till, No-Herbicide Continuous Grazing System for Dairy Cows  
- **LS93-054**  
- **Support:** $118,911  
- **Project Leaders:**  
  - Jean Bertrand  
  - Clemson University

### Professional Development Program Grants

<table>
<thead>
<tr>
<th>Project #</th>
<th>Project Title</th>
<th>SARE Support</th>
<th>Project Leaders</th>
</tr>
</thead>
</table>
| SPDP23-021 | Indigo and Companion Food Crops: Opportunities for Limited Resource Farmers in the Lowcountry of South Carolina and Georgia | $79,500 | David Harper  
  - International Center for Indigo Culture |
| SPDP22-15 | Training Educators in the Southern Region Using Aquaponics as a Sustainable Agriculture Solution | $71,322 | Dr. Lance Beecher  
  - Clemson University  
  - Ben Calhoun  
  - Greenwood Area SBDC  
  - Roland McReynolds  
  - Carolina Farm Stewardship Association |
### Train the Trainers: Reducing impacts from harmful algal blooms in livestock water sources in South Carolina
- **SPDP21-01**
- **SARE Support:** $79,975
- **Project Leaders:** Dr. Debabrata Sahoo, Clemson University; Dr. Matthew Burns, Clemson University; Mark Nettles, South Carolina State University, 1890 Research and Extension; Heather Nix, Clemson University Cooperative Extension; Dr. Michael Vassalos, Clemson University; Sarah White, Clemson University

### Advanced Soil Health Training for South Carolina Agriculture Professionals
- **ES19-150**
- **SARE Support:** $79,847
- **Project Leaders:** Kelly Flynn, Clemson University

### Wholesale Success: Building the capacity of farmers to meet demand for locally and sustainably grown produce
- **ES17-137**
- **SARE Support:** $78,008
- **Project Leaders:** Dr. Geoff Zehnder, Clemson University

### Training in Renewable Energy Systems for Small Farms to Reduce Energy Costs and Improve Profitability
- **ES13-117**
- **SARE Support:** $78,128
- **Project Leaders:** Dr. Geoff Zehnder, Clemson University

### Pollinator Conservation Short Course
- **ES11-108**
- **SARE Support:** $92,066
- **Project Leaders:** Eric Mader, The Xerces Society

### On-Farm Training in Organic Pest Management Practices for Small, Diversified Farms
- **ES10-106**
- **SARE Support:** $83,775
- **Project Leaders:** Dr. Geoff Zehnder, Clemson University

### Calhoun Fields Laboratory: A Program for Experiential Training in Organic Farming Systems
- **ES02-064**
- **SARE Support:** $49,926
- **Project Leaders:** Dr. Geoff Zehnder, Clemson University

### South Carolina Farm and Forest Land Conservation Training
- **ES01-057**
- **SARE Support:** $25,428
- **Project Leaders:** Ben Boozer, Clemson Institute for Economic & Community Develop

### The First Requirement of Agriculture Sustainability: Efficient Management of Available Resources
- **ES97-018**
- **SARE Support:** $60,000
- **Project Leaders:** Charles Q. Artis, South Carolina State University, Community and Economic Development

### Overcoming Training Obstacles: A Realistic Cost-Effective Approach
- **ES97-017**
- **SARE Support:** $10,000
- **Project Leaders:** Charles Q. Artis, South Carolina State University, Community and Economic Development

### Extending Sustainable Agriculture Concepts and Practices to Traditional Agricultural Advisors
- **LST94-006**
- **SARE Support:** $11,700
- **Project Leaders:** Jim Palmer, Clemson

## FARMER/RANCHER GRANTS

<table>
<thead>
<tr>
<th>Project #</th>
<th>Project Title</th>
<th>SARE Support</th>
<th>Project Leaders</th>
</tr>
</thead>
<tbody>
<tr>
<td>FS23-350</td>
<td>The Effectiveness in Attracting Oyster Spat on PVC versus Bamboo Stakes for Reef Restoration in the North Edisto River</td>
<td>$15,000</td>
<td>Alison Pierce, Barrier Island Oyster Co.</td>
</tr>
<tr>
<td>FS22-341</td>
<td>Does reduction of nitrate inputs in pasture land treated with Chlorella vulgaris result in cost savings and healthier soil and grass?</td>
<td>$10,975</td>
<td>Dale Snyder, Sweetgrass Garden Co-op</td>
</tr>
<tr>
<td>FS21-330</td>
<td>Does Treatment with Chlorella vulgaris Extend the Life of Tomato Plants to Increase Tomato Sales?</td>
<td>$14,640</td>
<td>Dale Snyder, Sweetgrass Garden Co-op</td>
</tr>
<tr>
<td>Project ID</td>
<td>Project Title</td>
<td>Funding</td>
<td>Principal Investigator</td>
</tr>
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<td>-----------</td>
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<td>------------------------</td>
</tr>
<tr>
<td>FS20-326</td>
<td>Summer Cover Crops for Organic No-till Broccoli</td>
<td>$14,820</td>
<td>Sarah Belk</td>
</tr>
<tr>
<td>FS18-309</td>
<td>Studying the Use of Copper to Raise Healthier Goats</td>
<td>$10,000</td>
<td>Judy Langley</td>
</tr>
<tr>
<td>FS17-300</td>
<td>Scaling Indigo Production in South Carolina</td>
<td>$5,965</td>
<td>Kathy McCullough</td>
</tr>
<tr>
<td>FS16-288</td>
<td>Modified Method for Roller-Crimper No Till System in the Southeast Coastal Plain</td>
<td>$8,327</td>
<td>Mary Connor</td>
</tr>
<tr>
<td>FS14-284</td>
<td>Is freshwater fish compost as effective as saltwater fish compost on vegetable production?</td>
<td>$10,000</td>
<td>Dale Snyder</td>
</tr>
<tr>
<td>FS13-276</td>
<td>Shade cloth for fall bearing blackberry druplet abortion/malfunction problems in southeastern USA</td>
<td>$6,458</td>
<td>Walker Miller</td>
</tr>
<tr>
<td>FS11-257</td>
<td>Is Fish Waste Compost worth the Mess and Effort?</td>
<td>$9,848</td>
<td>Dale Snyder</td>
</tr>
<tr>
<td>FS11-255</td>
<td>Cucumber Pollination with Bumblebees</td>
<td>$8,530</td>
<td>David MacFawn</td>
</tr>
<tr>
<td>FS10-247</td>
<td>Using Buckwheat to Attract Beneficial Insects for Crop Protection</td>
<td>$9,037</td>
<td>Daniel Parson</td>
</tr>
<tr>
<td>FS10-245</td>
<td>Forage Chicory Use in Rotational Grazing of Sheep to Reduce Intestinal Worms, Reduce Grain Supplementation, And Maximize Growth</td>
<td>$9,078</td>
<td>Kathy McCaskill</td>
</tr>
<tr>
<td>FS09-233</td>
<td>Dual Season Organic Asparagus Production</td>
<td>$9,995</td>
<td>Mary Connor</td>
</tr>
<tr>
<td>FS04-184</td>
<td>Edamame Variety Trials for the Local Fresh Market</td>
<td>$4,777</td>
<td>Carolyn A. Prince</td>
</tr>
<tr>
<td>FS99-102</td>
<td>Cattle Lane Construction Alternatives That Enhance Intensive Grazing Systems</td>
<td>$9,850</td>
<td>Tom Trantham</td>
</tr>
<tr>
<td>FS98-070</td>
<td>Red Plastic Mulch as an Alternative to Insecticides in Production of Seedless Watermelons</td>
<td>$7,390</td>
<td>John Frazier</td>
</tr>
<tr>
<td>FS98-079</td>
<td>Demonstration of a Low-Input Diversified Small Farm Operation</td>
<td>$9,200</td>
<td>Theodore Nesmith</td>
</tr>
<tr>
<td>FS95-033</td>
<td>Cover Crops in Integrated Vegetable Production Systems</td>
<td>$9,285</td>
<td>Charles Wingard</td>
</tr>
<tr>
<td>FS94-005</td>
<td>Vegetable Marketing Strategies for a Small Farm Co-op</td>
<td>$10,000</td>
<td>Curtis Inabinett</td>
</tr>
<tr>
<td>FS94-016</td>
<td>Clover Cover Crops, Weed Management and Consumer Tolerance to Insect Damage</td>
<td>$4,710</td>
<td>Horace &amp; Shaw Skipper</td>
</tr>
</tbody>
</table>
### GRADUATE STUDENT GRANTS

<table>
<thead>
<tr>
<th>Project #</th>
<th>Project Title</th>
<th>SARE Support</th>
<th>Project Leaders</th>
</tr>
</thead>
<tbody>
<tr>
<td>GS22-263</td>
<td>Development and Phenotypic Evaluation of a Brassica oleracea Leafy Greens Diversity Panel</td>
<td>$16,500</td>
<td>Dr. Sandra Branham, Khushwinder Kaur, Clemson University</td>
</tr>
<tr>
<td>GS22-259</td>
<td>PRECISION: leveraging deeP REinforCement learning algorithm for Sustainable IrrigatION scheduling</td>
<td>$16,500</td>
<td>Dr. Vidya Samadi, Lisa Umotoni, Clemson University</td>
</tr>
<tr>
<td>GS18-192</td>
<td>Cover Cropping to Improve Soil Moisture Content for the Following Cash Crop</td>
<td>$16,496</td>
<td>Dr. Sruthi Narayanan, Ricardo St. Aime, Clemson University</td>
</tr>
<tr>
<td>GS17-174</td>
<td>Optimizing Nutritional Management in Fruit Tree Production in Southern U.S.</td>
<td>$16,441</td>
<td>Juan Carlos Melgar, Qi Zhou, Clemson University</td>
</tr>
<tr>
<td>GS13-126</td>
<td>Weeds, Nitrogen, and Yield: Measuring the Effectiveness of an Organic No-Till System</td>
<td>$10,927</td>
<td>Dr. Geoff Zehnder, David Robb, Clemson University</td>
</tr>
<tr>
<td>GS04-034</td>
<td>Control of Soilborne Fungi with Biofumigation</td>
<td>$10,000</td>
<td>Anthony Keinath, Samuel Njoroge, Clemson University</td>
</tr>
<tr>
<td>GS04-041</td>
<td>Preliminary Investigation for Application of Supercritical Fluid Extraction Technology for Garlic Oil Extraction</td>
<td>$10,000</td>
<td>Dr. Terry Walker, Meidui Dong, Clemson University</td>
</tr>
<tr>
<td>GS03-020</td>
<td>The Assessment of Conservation and Traditional Tillage Systems on Weed Dynamics, Insect Abundance, and Northern Bobwhite Quail Life and Behavioral Patterns</td>
<td>$10,000</td>
<td>William Bowerman, Derek Eggert, Clemson University</td>
</tr>
</tbody>
</table>

### ON FARM RESEARCH/PARTNERSHIP GRANTS

<table>
<thead>
<tr>
<th>Project #</th>
<th>Project Title</th>
<th>SARE Support</th>
<th>Project Leaders</th>
</tr>
</thead>
<tbody>
<tr>
<td>OS20-133</td>
<td>The Potential of Inter-seeded Cover Crops for Enhancing Soil Health and Soil Moisture Content in a Row Crop Production System</td>
<td>$20,000</td>
<td>Dr. Sruthi Narayanan, Clemson University</td>
</tr>
<tr>
<td>OS18-118</td>
<td>Cover Cropping to Increase the Sustainability of Cropping Systems by Developing Soil Organic Matter, Improving Soil Health, and Suppressing Weed Growth</td>
<td>$15,000</td>
<td>Dr. Sruthi Narayanan, Clemson University</td>
</tr>
<tr>
<td>OS17-109</td>
<td>Identification of Factors Involved in Peach Skin Streaking</td>
<td>$15,000</td>
<td>Guido Schnabel, Clemson University</td>
</tr>
<tr>
<td>OS16-100</td>
<td>Getting to the Bottom of ‘Bronzing’, A Peach Skin Disorder Causing Severe Losses for Organic and Conventional Peach Growers</td>
<td>$15,000</td>
<td>Guido Schnabel, Clemson University</td>
</tr>
<tr>
<td>OS16-096</td>
<td>Cover Crop Influence on Stored Soil Water Availability to Subsequent Crops</td>
<td>$14,995</td>
<td>Dr. Sruthi Narayanan, Clemson University</td>
</tr>
<tr>
<td>OS16-094</td>
<td>Fruit Bagging as a Strategy to Reduce Reliance on Pesticides for the Production of Peaches in the Southeast</td>
<td>$14,967</td>
<td>Juan Carlos Melgar, Clemson University</td>
</tr>
<tr>
<td>Project #</td>
<td>Project Title</td>
<td>SARE Support</td>
<td>Project Leaders</td>
</tr>
<tr>
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<td>------------------------------------------------------</td>
</tr>
</tbody>
</table>
| OS16-093  | Increasing Sustainability of Peanut, Cotton, and Soybean Production Systems Through Innovative Interseeding Technology to Enhance Farm Profit and Reduce Pest Occurrence | $14,990      | Daniel Anco  
Clemson University                           |
| OS07-035  | On-Farm Use of a Hybrid Vetch Cover Crop to Reduce Fusarium Wilt in Seedless Watermelon | $9,900       | Anthony Keinath  
Clemson University                           |
| OS03-010  | Poultry Litter Research Project                                                  | $12,600      | David Gunter  
Clemson Extension Service                    |
| OS03-013  | Growing Organic Fruits and Vegetables for Local Farmer’s Markets                 | $9,925       | York Glover                                            |

**SUSTAINABLE COMMUNITY INNOVATION GRANTS**

<table>
<thead>
<tr>
<th>Project #</th>
<th>Project Title</th>
<th>SARE Support</th>
<th>Project Leaders</th>
</tr>
</thead>
</table>
| CS12-087  | Fighting Obesity in Schools By Changing Eating Habits of Students               | $10,000      | Robert Behr  
Ashley Ridge High School                         |
| CS10-078  | GrowFood Carolina                                                              | $10,000      | Lisa Turansky  
South Carolina Coastal Conservation League         |
| CS08-064  | Growing the Manning Farmer’s Market                                             | $5,050       | Rebecca Rhodes  
City of Manning                                      |
| CS08-065  | Marshview Community Organic Farms – Young Farmers of the Lowcountry             | $9,700       | Sara Reynolds  
Marshview Community Organic Farm                    |
| CS07-058  | Farmers Market Support Activities                                               | $2,570       | Grady Sampson                                         |
| CS07-059  | Chicora Farmers Market                                                          | $6,300       | Amanda Crump  
Metanoia CDC                                           |

**EDUCATION ONLY GRANTS**

<table>
<thead>
<tr>
<th>Project #</th>
<th>Project Title</th>
<th>SARE Support</th>
<th>Project Leaders</th>
</tr>
</thead>
</table>
| EDS23-054 | Gullah/Geechee Heir Property Initiative: Sustaining Heir Property in the Lowcountry Through Sustainable Agriculture | $40,000      | Willie Turral  
Gullah Geechee Initiative Foundation                |
| EDS23-047 | Young Tree Farmers Camp                                                         | $46,000      | Dr. Jennie Stephens  
Center for Heirs’ Property Preservation  
Steve Patterson  
Center for Heirs’ Property Preservation                |
| EDS22-43  | Wholesale Market Success For Limited Resource Gullah Farmers                    | $49,500      | Walter Mack  
Gullah Farmers Cooperative Association                |

Total funding from the USDA SARE program to South Carolina $5,096,043
For further information on projects, contact 770-412-4787 or ssare@uga.edu. Sustainable Agriculture Research and Education (SARE) is funded by USDA’s National Institute of Food and Agriculture (NIFA).